

GE866-QUAD Product Description

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APPLICABLE PRODUCTS

PRODUCT
GE866-QUAD



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1. Introduction

1.1. Scope

Scope of this document is giving an overview of the Telit GE866-QUAD module, which is a compact GSM/GPRS module with data and voice capabilities.

1.2. Audience

This document is intended for customers who are evaluating the GE866-QUAD.

1.3. Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit's Technical Support Center (TTSC) at:

TS-EMEA@telit.com
TS-NORTHAMERICA@telit.com
TS-LATINAMERICA@telit.com
TS-APAC@telit.com

Alternatively, use:

<http://www.telit.com/en/products/technical-support-center/contact.php>

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

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Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.



1.4. Document Organization

This document contains the following chapters:

[“Chapter 1: “Introduction”](#) provides a scope for this document, target audience, contact and support information, and text conventions.

[“Chapter 2: “The GE866-QUAD”](#) gives an overview of the features of the product.

[“Chapter 3: “Product Description”](#) describes in details the characteristics of the product.

[“Chapter 4: “Evaluation Kit”](#) provides some basic information about the Evaluation Kit.

[“Chapter 5: “Software Features”](#) provides an overview of the software features of the products.

[“Chapter 6: “Safety Recommendation”](#) provides some safety recommendations that must be follow by the customer in the design of the application that makes use of the GE866-QUAD.

[“Chapter 7: “List of acronyms”](#)

[“Chapter 8: “Document history”](#)

1.5. Text Conventions



Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.



Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.



Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.6. Related Documents

- 1VV0301051 GE866-QUAD Hardware User Guide



2. The GE866-QUAD

2.1. Product Overview

The GE866-QUAD is the smallest generation in Telit's 2G module portfolio. With its ultra-compact 15 x 19 mm LGA footprint, it is designed for those m2m applications requiring miniature foot print.

It is a quad-band 850/900/1800/1900 MHz GSM / GPRS communication product based on the market's latest 2G core which allows integrators to plan on availability for even the longest lifecycle applications, highly recommended for new designs specified for 2G coverage worldwide.

It is highly recommended for new designs requiring 2G coverage in an ultra-small and robust LGA package, which implies easy integration and low impact on final application size and costs. Ease of production and small foot print makes it the ideal solution for applications in security alarms, automated meter reading, and pos terminals.

The product is fully voice capable, the analog and digital audio interfaces make it suitable for applications such as voice enabled alarm panels, mHealth patient monitors and specialty phones such as those for the elderly or sensory-impaired.

The GE866-QUAD operates with 1.8 V GPIOs, minimizing power consumption and making it even more ideally suited for battery powered and wearable device applications.

The GE866-QUAD makes it possible to run the customer's application inside the module by means its embedded Python Script Interpreter, thus making it a complete SMT platform for m2m solutions.

All Telit modules, support Over-the-Air firmware update by means Premium FOTA Management. By embedding Red Bend Software vRapid Mobile® agent, a proven and battle-tested technology powering hundreds of millions of cellular handsets world-wide Telit is able to update its products by transmitting only a delta file, which represents the difference between one firmware version and another.



2.2. Target Market

The GE866-QUAD is designed and developed for the usage in applications, such as:

- Battery powered, wearable devices
- Automated Meter Reading (AMR)
- Security alarms and non-video surveillance
- Self-powered asset tracking
- POS terminals

2.3. Product Features

- GE866-QUAD: Quad-band GSM 850/900/1800/1900 MHz
- GSM/GPRS protocol stack 3GPP Release 4 compliant
- Output power
 - Class 4 (2W) @ 850/900 MHz
 - Class 1 (1W) @ 1800/1900 MHz
- Control via AT commands according to 3GPP 27.005, 27.007 and Telit custom AT commands
- Control via Remote AT commands
- Power consumption (typical values)
 - Power off: 2 uA
 - Idle: 0.9 mA @ DRX=9
- Serial port multiplexer 3GPP 27.010
- SIM Application Toolkit 3GPP TS 51.014
- SIM Access Profile
- Extended Supply voltage range: 3.10 – 4.50 V DC (3.8 V DC nominal)
- TCP/IP stack access via AT commands
- Sensitivity:
 - ≤ -108 dBm (typ.) @ 850/900 MHz
 - ≤ -107 dBm (typ.) @ 1800/1900 MHz
- DARP/SAIC support
- Enhanced Measurement Report support
- Dimensions: 19 x 15 x 2.2 mm
- Storage and Operating temperature range: -40°C to +85°C



Interfaces

- 7 I/O ports maximum
- Analog audio (balanced)
- Digital audio
- 1 A/D plus 1 D/A converters
- Buzzer output
- ITU-T V.24 serial link through CMOS UART:
 - Baud rate from 300 to 115.200 bps
 - Autobauding up to 115.200 bps

Audio

- Telephony, emergency call
- Half rate, full rate, enhanced full rate and adaptive multi rate voice codecs (HR, FR, EFR, AMR)
- Superior echo cancellation & noise reduction
- Multiple audio profiles pre-programmed and fully configurable
- Embedded DTMF decoder

Approvals

- Fully type approved conforming with R&TTE directive
- GCF
- FCC, IC
- PTCRB
- RoHS compliant

SMS

- Point-to-point mobile originated and mobile terminated SMS
- Concatenated SMS supported
- SMS cell broadcast
- Text and PDU mode
- SMS over GPRS



Circuit switched data transmission

- Asynchronous non-transparent CSD up to 9.6 kbps
- V.110

GPRS data

- GPRS class 10
- Mobile station class B
- Coding scheme 1 to 4
- PBCCH support
- GERAN Feature Package 1 support (NACC, Extended TBF)

GSM Supplementary Services

- Call forwarding
- Call barring
- Call waiting & call hold
- Advice of charge
- Calling line identification presentation (CLIP)
- Calling line identification restriction (CLIR)
- Unstructured supplementary services mobile originated data (USSD)
- Closed user group

Additional features

- SIM phonebook
- Fixed dialling number (FDN)
- Real Time Clock
- Alarm management
- Network LED support
- IRA, GSM, 8859-1 and UCS2 character sets
- Jamming detection
- Embedded TCP/IP stack, including TCP, IP, UDP, SMTP, ICMP and FTP protocols
- EASY SCAN ® automatic scan over GSM frequencies (also without SIM card)



Python* application resources

- Python* script interpreter (module takes the application code directly in the Python* language)
- Memory: 800 kB of NV memory for the user scripts and 1 MB RAM for the Python* engine usage
- Over-the-air application SW update

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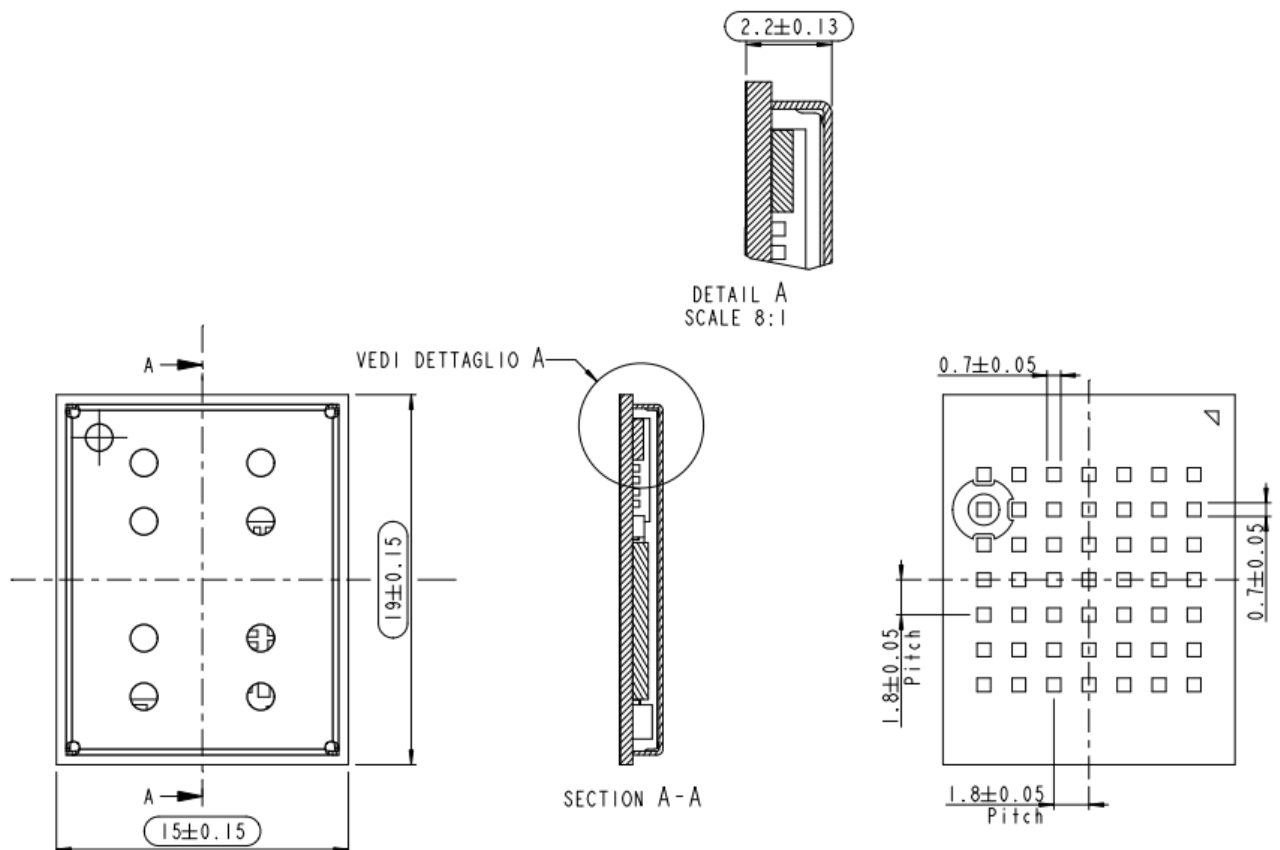


3. Product Description

3.1. Size and 2D mechanical drawing

The Telit GE866-QUAD module overall dimensions are:

- Length: 19 mm
- Width: 15 mm
- Thickness: 2.2 mm



3.2. Environmental requirements

3.2.1. Temperature range

Storage and Operating Temperature Range	−40°C ÷ +85°C
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3.2.2. RoHS compliance

As a part of Telit's corporate policy of environmental protection, the GE866-QUAD product comply with the RoHS (Restriction of Hazardous Substances) directive of the European Union (EU Directive 2011/65/EU).

3.3. Operating Frequencies

The operating frequencies in GSM, DCS modes are conform to the GSM specifications.

Mode	Freq. TX (MHz)	Freq. RX (MHz)	Channels (ARFC)	TX - RX offset
GSM 850	824.2-848.8	869.2-893.8	124 ÷ 251	45 MHz
GSM 900	890.0 - 914.8	935.0 - 959.8	0 ÷ 124	45 MHz
	880.2 - 889.8	925.2 - 934.8	975 ÷ 1023	45 MHz
DCS 1800	1710.2 - 1784.8	1805.2 - 1879.8	512 ÷ 885	95 MHz
PCS 1900	1850.2-1909.8	1930.2-1989.8	512 ÷ 810	80 MHz

3.4. Transmitter output power

The GE866-QUAD transceiver modules operating mode in GSM 850 / 900 bands is Class 4 in accordance with the specifications which determine the nominal 2W peak RF power (+33dBm) on 50 Ohm. In the DCS 1800 / PCS 1900 bands, the operating mode is Class 1 in accordance with the specifications, which determine the nominal 1W peak RF power (+30dBm) on 50 Ohm.

3.5. Receiver sensitivity

Sensitivity of the module in GSM 850 / 900 bands is better than −108 dBm (2.4% BER Class II - static channel) in normal operating conditions.

Sensitivity of the module in GSM 1800 / 1900 bands is better than −107 dBm (2.4% BER Class II - static channel) in normal operating conditions.

The GE866-QUAD supports also the Downlink Advance Receiver Performance (DARF) feature for single antenna interference cancellation (SAIC).



3.6. Antenna

The antenna and antenna transmission line on PCB for a Telit GE866-QUAD device shall fulfill the following requirements:

Frequency range	Depending by frequency band(s) provided by the network operator, the customer shall use the most suitable antenna for that/those band(s).
Bandwidth	70 MHz in GSM 850, 80 MHz in GSM 900, 170 MHz in DCS and 140 MHz in PCS band

For further information please refer to the GE866-QUAD Hardware User Guide.

3.7. Supply voltage

The external power supply must be connected to VBATT & VBATT_PA signals and must fulfill the following requirements:

Nominal Supply Voltage	3.8 V
Normal Operating Voltage Range	3.40 V – 4.20 V
Extended Operating Voltage Range (*)	3.10 V – 4.50 V

(*) Please refer to the GE866-QUAD Hardware User Guide to use the product with the extended operating voltage range.

3.8. Power consumption

The current consumptions of the Telit GE866-QUAD in power-off and idle modes are:

Switched off current typical (Module power supplied only on VBATT_PA pin, the VBATT pin is not power supplied.)	2 uA
Idle registered, power saving	0.9 mA @ DRX=9 with AT+CFUN=5

Please check the HW User Guide for further details about all other power consumption figures.

3.9. The user interface

The user interface is managed by AT commands according to ITU-T V.250, 3GPP 27.007 and 27.005 specifications. Moreover, custom AT commands are also available. Please refer to the AT Command User Guide for details.



3.10. Speech CODEC

The GE866-QUAD supports the following voice codec:

- HR - Half Rate
- FR - Full Rate
- EFR - Enhanced Full Rate
- AMR-HR, AMR Half Rate
- AMR-FR, AMR Full Rate

3.11. SIM Reader

The GE866-QUAD supports phase 2 SIM at 1.8V and 3V ONLY with an external SIM connector. For 5V SIM, an external level translator can be added.

3.12. SMS

The GE866-QUAD supports the following SMS types:

- Mobile Terminated (MT) class 0 – 3 with signaling of new incoming SMS, SIM full, SMS read
- Mobile Originated class 0 – 3 with writing, saving in SIM and sending
- Cell broadcast compatible with CB DRX with signaling of new incoming SMS.

The GE866-QUAD also supports SMS over GPRS

3.13. Real Time Clock and Alarm

The GE866-QUAD supports the Real Time Clock and Alarm functions through AT commands. An alarm output pin can be configured to indicate the alarm with a hardware line output.

Furthermore the Voltage Output of the RTC power supply is provided so that a backup battery can be added to increase the RTC autonomy during power off of the main battery (power supply).

3.14. Enhanced Measurement Report

The GE866-QUAD supports the Enhanced Measurement Report on SACCH channel according to 3GPP TS 44.018 version 4.22.0 Release 4 (par. 3.4.1.2, 9.1.54, 9.1.55) and 3GPP TS 45.008 version 4.17.0 Release 4 (par. 8.4.8).

3.15. Data transmission capabilities

The Telit GE866-QUAD is a mobile station class B supporting GPRS Class 10, coding schemes 1 to 4 and PBCCH. Moreover, it supports GERAN feature package 1, which consist in supporting the Extended Uplink TBF and Network Assisted Cell Change (NACC).



As for circuit switched data, the GE866-QUAD supports asynchronous non-transparent data up to 9.6 Kbps. Moreover, it supports the V.110.

3.16. Local security management

The local security management can be done with the lock of Subscriber Identity module (SIM). The security code will be requested at power-up.

3.17. Call control

The call cost control function is supported.

3.18. Phonebook

This function allows the storage of the telephone numbers in SIM memory. The capability depends on SIM version and its embedded memory.

3.19. Characters management

The GE866-QUAD supports the IRA, GSM, 8859-1 and UCS2 characters sets, in TEXT and PDU mode.

3.20. SIM related functions

Fixed Dialing Numbers (FDN), Abbreviated Dialing Number (ADN) and PIN insertion are supported.

Extension at the PIN2 for the PUK2 insertion capability for lock condition is supported too.

3.21. Call status indication

The call status indication is supported.

3.22. Automatic answer (Voice, Data)

The automatic answer is supported. The user/application can specify the number of rings after which the module will automatically answer.

The user/application can set the number of rings by means of the command `ATS0=<n>`.

3.23. Supplementary services (SS)

The following supplementary services are supported:

- Call Barring,
- Call Forwarding,
- Calling Line Identification Presentation (CLIP),
- Calling Line Identification Restriction (CLIR),
- Call Waiting, other party call Waiting Indication,



- Call Hold, other party Hold / Retrieved Indication,
- Closed User Group supplementary service (CUG),
- Advice of Charge,
- Unstructured SS Mobile Originated (MO)

3.24. Acoustic signaling

The acoustic signaling of the GE866-QUAD on the selected acoustic device are the following:

- Call waiting;
- Ringing tone;
- SMS received tone;
- Busy tone;
- Power on/off tone;
- Off Hook dial tone;
- Congestion tone;
- Connected tone;
- Call dropped;
- No service tone;
- Alarm tone.

3.25. Buzzer output

The GPIO6 pad, when configured as Buzzer Output, is controlled by the GE866-QUAD module and will drive a Buzzer driver with appropriate square waves.

This permits to your application to easily implement Buzzer feature with ringing tones or melody played at the call incoming, tone playing on SMS incoming or simply playing a tone or melody when needed.

3.26. RF Transmission Monitor (RFTXMON)

The GPIO5 pin, when configured as RFTXMON Output, is controlled by the GE866-QUAD module and will rise when the transmitter is active and fall after the transmitter activity is completed. Please refer to the GE866-QUAD Hardware User Guide for further information.

3.27. RF Transmission Control

The GPIO4 pin, when configured as RF Transmission Control Input, permits to disable the Transmitter when the GPIO is set to Low by the application.

In the design is necessary to add a resistor 47K pull up to 2.8V, this pull up must be switched off when the module is in off condition.



3.28. TTY (Telephone Text)

The TTY feature is supported. Please refer to 3GPP TS 26.226 and 3GPP TS 26.231 for details.

3.29. Logic level specifications

Where not specifically stated, all the interface circuits work at 1.8V CMOS logic levels. To get more detailed information about the logic level specifications used in the GE866-QUAD, please check the Hardware User Guide.

3.30. Audio

3.30.1. Analog

The GE866-QUAD offers one audio line balanced. For more details, please refer to the GE866-QUAD Hardware User Guide.

3.30.2. Digital

The GE866-QUAD offers the digital voice interface. For more details, please refer to the Digital Voice Interface Application Note.

3.31. Serial Ports

Two serial ports are available on the module:

- MODEM SERIAL PORT 1 (Main, ASC0)
- MODEM SERIAL PORT 2 (Auxiliary, ASC1)

3.32. Converters

3.32.1. ADC Converter

The GE866-QUAD provides a Digital to Analog Converter. The signal (named DAC_OUT) is available on pin E4 of the GE866-QUAD.

3.32.2. DAC Converter

The GE866-QUAD has one on board DAC, which is a 10 bit converter, able to generate an analogue value based a specific input in the range from 0 up to 1023. However, an external low-pass filter is necessary. See the Hardware User Guide for the details.

3.33. Mounting the GE866-QUAD on your Board

The Telit GE866-QUAD module has been designed to be compliant with a standard lead-free SMT process. For detailed information about PCB pad design and conditions to use in SMT process please check with the GE866-QUAD Hardware User Guide.



3.34. Packing system

The Telit GE866-QUAD is supplied in in reels of 500pcs each (TBC) and in trays of 50 pieces each when small quantities are required, please refer to the Hardware User Guide for further details.



4. Evaluation Kit

In order to assist the customer in the development of the application, Telit offers the EVK2 Evaluation Kit that can be ordered separately. The EVK2 has a SIM card holder, the RS 232 serial port level translator, a direct UART connection, audio and antenna connector.

The EVK2 provides a fully functional solution for a complete data or phone application. The standard serial RS232 9 pin connector placed on the Evaluation Kit allows the connection of the EVK2 system with a PC or other DTE.

The development of the applications utilizing the Telit GE866-QUAD module must present a proper design of all the interfaces towards and from the module (e.g. power supply, audio paths, level translators), otherwise a decrease in the performance will be introduced or, in the worst case, a wrong design can even lead to an operating failure of the module.

In order to assist the hardware designer in his project phase, the EVK2 board presents a series of different solutions, which will cover the most common design requirements on the market, and which can be easily integrated in the OEM design as building blocks or can be taken as starting points to develop a specific one.

For a detailed description of the Telit Evaluation Kit, please refer to the documentation provided with the Telit GE866-QUAD Hardware User Guide and EVK2 User Manual.



5.3. Jamming Detection

5.3.1. Overview

The Jammer Detect feature allows the GE866-QUAD to detect the presence of a disturbing device such as a Communication Jammer and give indication to the user.

This feature can be very important in alarm, security and safety applications that rely on the module for the communications. In these applications, the presence of a Jammer device can compromise the whole system reliability and functionality and therefore shall be recognized and reported to the local system for countermeasure actions.

5.4. CMUX

CMUX (Converter-Multiplexer) is a multiplexing protocol implemented in the GE866-QUAD that can be used to send any data, SMS, or TCP data.

5.4.1. Architecture

The Multiplexer mode enables one serial interface to transmit data to four different customer applications. This is achieved by providing four virtual channels using a Multiplexer (MUX).

This is especially advantageous when a data/GPRS call is ongoing. Using the Multiplexer features, e.g. controlling the module or using the SMS service can be done via the additional channels without disturbing the data flow; access to the second UART is not necessary.

Furthermore, several accesses to the module can be created with the Multiplexer. This is of great advantage when several independent electronic devices or interfaces are used.

To access the three virtual interfaces, both the GSM engine and the customer application must contain MUX components, which communicate over the multiplexer protocol.

In Multiplexer mode, AT commands and data are encapsulated in packets. Each packet has channel identification and may vary in length.

5.4.2. Features

- 3GPP 27.010 CMUX Basic Option used
- CMUX implementation support four full DLCI (Serial Port)
- Every CMUX instance has its own user profile storage in NVM
- Independent setting of unsolicited message.
- Every CMUX instance has its own independent flow control

NOTE: More details about the Multiplexer mode are available in the CMUX User Guide.



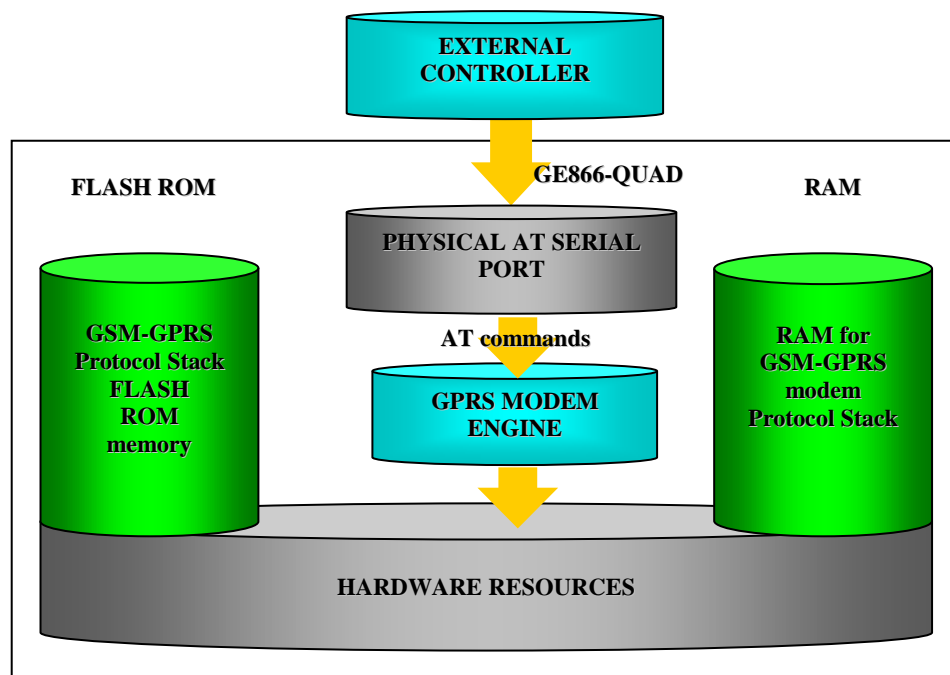
5.5. Easy Script Extension - Python interpreter

5.5.1. Overview

The Easy Script Extension is a feature that allows driving the modem "internally", writing the controlling application directly in a nice high level language: Python.

The Easy Script Extension is aimed at low complexity applications where the application was usually done by a small microcontroller that managed some I/O pins and the GE866-QUAD through the AT command interface.

A schematic of such a configuration can be:



In order to not use any external controller, and further simplify the programming of the sequence of operations, the customer can benefit of the following features:

- Python script interpreter engine v. 1.5.2+
- 800 kB of Non Volatile Memory room for the user scripts and data
- 1 MB RAM reserved for Python engine usage



5.5.2. Python 1.5.2+ Copyright Notice

The Python code implemented in the Telit module is copyrighted by Stichting Mathematisch Centrum, this is the license:

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NOTE: More details about the Python modules are available in the Easy Script in Python User Guide.

5.6. SAP: SIM Access Profile

5.6.1. Architecture

The SAP feature allows the module to use the SIM of a remote SIM Server. This feature is implemented using special AT Command on a Virtual circuit of the CMUX interface.



5.6.2. Implementation features

- SAP is based on 3GPP 27.010 CMUX Basic Option used
- Only SAP Client features
- Logic HW flow control is recommended on the Virtual instance selected for the SAP command.

5.6.3. Remote SIM Message Command Description

The module sends request commands to the client application through a binary message that is crowned in the CMUX message. The client application shall extract the message and send it to the SAP server, through the appropriate protocols (e.g. by RFCOMM, that is the Bluetooth serial port emulation entity).

The client application shall extract all the messages sent by SAP server and put them in the CMUX message, to be sent to the module.

The module fulfills the following feature requirements:

- Connection management
- Transfer APDU
- Transfer ATR
- Power SIM on
- Report Status
- Error Handling

Every feature needs some procedures support:

Feature	Procedure
Connection Management	Connect
	Report Status
	Transfer ATR
	Disconnection Initiated by the Client
	Disconnection Initiated by the Server
Transfer APDU	Transfer APDU
Transfer ATR	Transfer ATR
Power SIM on	Power SIM on
	Transfer ATR
Report Status	Report Status
Error Handling	Error Response

Report Status, Disconnection Initiated by the Server and Error Response are independent messages sent by server. The other procedures consist of couples of messages, started by client.

NOTE: More details about the SAP are available in the SAP User Guide.



5.7. Premium FOTA Management (PFM) Service

The premium FOTA Management Service provides a cost-effective, fast, secure and reliable way for wirelessly reflashing the firmware on mobile devices, ensuring that embedded software is up-to-date with the latest enhancements and features.

Customers, who want to benefit from this service, must pass through the Telit certification program, where Telit will assist the customer in validating the correct implementation of FOTA.

5.7.1. FOTA (Firmware Over The Air)

Telit, which has signed a partnership agreement with the worldwide leader of Firmware OTA technology Red Bend, has integrated its unique vCurrent® Mobile client software in its m2m product portfolio. Telit is therefore able to upgrade its products by transmitting only a delta file, which represents the difference between one firmware version and another.

See “PFM Application Note” for details in www.telit.com > Product > GSM/GPRS > Product Family > Application Notes.

5.8. AT Commands

The Telit GE866-QUAD module can be driven via the serial interface using the standard AT commands.

The Telit GE866-QUAD module is compliant with:

1. Hayes standard AT command set to maintain the compatibility with existing SW programs.
2. 3GPP 27.007 specific AT command and GPRS specific commands.
3. 3GPP 27.005 specific AT commands for SMS (Short Message Service) and CBS (Cell Broadcast Service)

Moreover the GE866-QUAD module supports also Telit proprietary AT commands for special purposes.

For a more information about AT commands supported by the GE866-QUAD module please refer to document AT Commands Reference Guide.



6. SAFETY RECOMMENDATIONS

READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc
- Where there is risk of explosion such as gasoline stations, oil refineries, etc

It is the responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity.

We recommend following the instructions of the hardware user guides for a correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conforming to the security and fire prevention regulations.

The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. Same cautions have to be taken for the SIM, checking the instruction for its use carefully. Do not insert or remove the SIM when the product is in power saving mode.

The system integrator is responsible for the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as any project or installation issue, because the risk of disturbing the GSM network or external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force.

Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm). In case this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

The European Community provides some Directives for the electronic equipment introduced on the market. All the relevant information's are available on the European Community website:

<http://ec.europa.eu/enterprise/rtte/dir99-5.htm>

The text of the Directive 99/05 regarding telecommunication equipment is available, while the applicable Directives (Low Voltage and EMC) are available at:

http://ec.europa.eu/enterprise/electr_equipment/index_en.htm



7. List of acronyms

ACM	Accumulated Call Meter
ASCII	American Standard Code for Information Interchange
AT	Attention commands
CB	Cell Broadcast
CBS	Cell Broadcasting Service
CCM	Call Control Meter
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CMOS	Complementary Metal-Oxide Semiconductor
CR	Carriage Return
CSD	Circuit Switched Data
CTS	Clear To Send
DAI	Digital Audio Interface
DCD	Data Carrier Detected
DCE	Data Communications Equipment
DRX	Data Receive
DSR	Data Set Ready
DTA	Data Terminal Adaptor
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
EMC	Electromagnetic Compatibility
ETSI	European Telecommunications Equipment Institute
FTA	Full Type Approval (ETSI)
GPRS	General Radio Packet Service
GSM	Global System for Mobile communication
HF	Hands Free
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IRA	International Reference Alphabet
ITU	International Telecommunications Union
IWF	Inter-Working Function
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LF	Linefeed
ME	Mobile Equipment
MMI	Man Machine Interface
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
OEM	Other Equipment Manufacturer
PB	Phone Book



PDU	Protocol Data Unit
PH	Packet Handler
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PUCT	Price per Unit Currency Table
PUK	PIN Unblocking Code
RACH	Random Access Channel
RLP	Radio Link Protocol
RMS	Root Mean Square
RTS	Ready To Send
RI	Ring Indicator
SCA	Service Center Address
SIM	Subscriber Identity Module
SMD	Surface Mounted Device
SMS	Short Message Service
SMSC	Short Message Service Center
SS	Supplementary Service
TIA	Telecommunications Industry Association
UDUB	User Determined User Busy
USSD	Unstructured Supplementary Service Data



8. Document History

Revision	Date	Changes
0	2013-10-02	First issue
1	2014-02-07	Updated power consumption, packing system
2	2014-09-05	Updated “Size and 2D mechanical drawing”

